



MARK A. YOUNG
EXECUTIVE DIRECTOR

LOWELL REGIONAL WASTEWATER UTILITY

WASTEWATER COLLECTION AND TREATMENT



SERVING LOWELL
CHELMSFORD
DRACUT
TEWKSBURY
TYNGSBORO

May 13, 2020

RE: MA0100633

To Whom It May Concern:

The following is an itemization of status and improvements for the Lowell Regional Wastewater Utility during April 2020. Enclosed is a copy of the Discharge Monitoring Report, Down Stream Notification Reports, and required NPDES permit monitoring data for this period.

The Discharge Monitoring Report is being submitted electronically through the Environmental Protection Agency NetDMR website and also via email to the Massachusetts Department of Environmental Protection.

PERMIT EXCEEDANCES:

- There were no permit exceedances for the month of April 2020.

PROCESS CHANGES AND IMPROVEMENTS:

- The primary and secondary clarifiers are undergoing a complete upgrade as part of the phase 2B construction project. This has limited flow through the facility and impacted wet weather flow capacity.
 - Primary Clarifier No.3 was taken offline for construction on 3/26.
 - Primary Clarifier No.6 construction was completed and the clarifier was returned to service on 4/3.
 - Secondary Clarifier No.2 construction was completed and the clarifier was returned to service on 4/26.
 - Secondary Clarifier No.1 was taken offline for construction on 4/28.
- Anoxic periods in the last cell of the aeration system have been disabled due to the fact that it is not currently needed for NO₃ control.
- A new temporary Centrisys centrifuge was commissioned on 3/18. This has replaced the previous temporary Pace centrifuge. The new unit provides for a more reliable dewatering process, which also produces a drier sludge cake.
- Thickened Waste Pump No.743 was replaced with a temporary progressive cavity pump on 4/2. This is being done to ensure stable and reliable thickened primary sludge pumping to the centrifuge is available.

- The sodium bisulfite feed system is being upgraded as part of the Phase 2B construction project. The system, including the pumps, was fully upgraded and brought online 1/10.
 - The new bisulfite feed system was turned off and operation of the old bisulfite feed system is being used until issues with the new feed system are resolved.
- The Duck Island SCADA system is being upgraded as part of the Phase 2B construction project. This upgrade will enhance the control, automation, and data collection capabilities of the SCADA system.
 - The Utility has been in the process of transitioning to the new system, which went live on 9/27.

ODOR COMPLAINTS:

- There were no reported odor complaints during this period.

Respectfully,

A handwritten signature in black ink, appearing to read 'Aaron Fox', with a stylized flourish at the end.

Aaron Fox, Operations Manager
Lowell Regional Wastewater Utility
First St. Blvd. (Rt. 110)
Lowell MA 01850

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

Form Approved.

OMB No. 2040-0004

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: LOWELL REGIONAL WW UTILITY
ADDRESS: 451 FIRST ST BLVD
 LOWELL, MA 01850
FACILITY: LOWELL REGIONAL WW UTILITY
LOCATION: 451 FIRST ST BLVD
 LOWELL, MA 01850

MA0100633
 PERMIT NUMBER

035-A
 DISCHARGE NUMBER

DMR MAILING ZIP CODE: 01850

MAJOR \$

(SUBR E)

TREATED EFFLUENT

External Outfall

ATTN: AARON FOX, OPERATIONS MANAGER


FROM

MONITORING PERIOD		
MM/DD/YYYY	TO	MM/DD/YYYY
04/01/2020		04/30/2020

TO

NO DISCHARGE

PARAMETER		QUANTITY OR LOADING				QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE 1	VALUE 2	VALUE 3	UNITS	VALUE 1	VALUE 2	VALUE 3	UNITS			
Oxygen, dissolved (DO)	SAMPLE MEASUREMENT	*****	*****	*****	*****	9.44	*****	*****	mg/L	0	01/01	GR
00300 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	*****	mg/L		Daily	GRAB
pH	SAMPLE MEASUREMENT	*****	*****	*****	*****	6.6	*****	7.0	SU	0	01/01	GR
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	6.0 MINIMUM	*****	8.3 MAXIMUM	SU		Daily	GRAB
Solids, total suspended	SAMPLE MEASUREMENT	3,557	5,279	15,471	lb/d	10.5	14.42	38.0	mg/L	0	05/07	24
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	8,006 MO AVG	12,010 WKLY AVG	Req. Mon. DAILY MX	lb/d	30 MO AVG	45 WKLY AVG	Req. Mon. DAILY MAX	mg/L		Weekdays	COMP24
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	167.3	*****	*****	mg/L	0	02/30	24
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	*****	mg/L		Twice per Month	COMP24
TSS % Removal	SAMPLE MEASUREMENT	*****	*****	*****	*****	95.2	*****	*****	%	0	01/30	CA
	PERMIT REQUIREMENT	*****	*****	*****	*****	85 MINIMUM	*****	*****	%		Monthly	CALC
Total Nitrogen	SAMPLE MEASUREMENT	*****	*****	*****	*****	15.84	*****	28.50	mg/L	0	01/07	CA
Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	Req. Mon DAILY MAX	mg/L		Weekly	CALC
TKN	SAMPLE MEASUREMENT	*****	*****	*****	*****	11.56	*****	13.60	mg/L	0	01/07	24
Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	Req. Mon DAILY MAX	mg/L		Weekly	COMP24
NO3,2-N	SAMPLE MEASUREMENT	*****	*****	*****	*****	4.28	*****	17.70	mg/L	0	01/07	24
Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	Req. Mon DAILY MAX	mg/L		Weekly	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.			TELEPHONE		DATE
978 674-4248				05/13/2020		
AARON FOX OPERATIONS SUPERINTENDENT			SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA CODE	NUMBER
TYPED OR PRINTED						

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

Form Approved.

OMB No. 2040-0004

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: LOWELL REGIONAL WW UTILITY
ADDRESS: 451 FIRST ST BLVD
 LOWELL, MA 01850
FACILITY: LOWELL REGIONAL WW UTILITY
LOCATION: 451 FIRST ST BLVD
 LOWELL, MA 01850

ATTN: AARON FOX, OPERATIONS MANAGER

MA0100633	035-A
PERMIT NUMBER	DISCHARGE NUMBER

DMR MAILING ZIP CODE: 01850

MAJOR \$

(SUBR E)

TREATED EFFLUENT

External Outfall

NO DISCHARGE

MONITORING PERIOD		
MM/DD/YYYY	TO	MM/DD/YYYY
04/01/2020		04/30/2020

PARAMETER		QUANTITY OR LOADING				QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE 1	VALUE 2	VALUE 3	UNITS	VALUE 1	VALUE 2	VALUE 3	UNITS			
Phosphorus, total (as P)	SAMPLE MEASUREMENT	*****	*****	*****	*****	0.82	*****	1.42	mg/L	0	01/07	24
00665 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	Req. Mon. DAILY MX	mg/L		Weekly	COMP24
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	28.12	38.25	69.05	MGD	*****	*****	*****	*****	0	99/99	RC
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	32 12MO AVG	Req. Mon. MO AVG	Req. Mon. DAILY MX	MGD	*****	*****	*****	*****		Continuous	RCORDR
Chlorine, total residual	SAMPLE MEASUREMENT	*****	*****	*****	*****	35.00	*****	150	µg/L	0	01/01	GR
50060 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	196 MO AVG	*****	338 DAILY MX	µg/L		Daily	GRAB
Chlorine, total residual	SAMPLE MEASUREMENT	*****	*****	*****	*****	71.00	*****	510	µg/L	0	99/99	RC
50060 0 0 Intake	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	Req. Mon. DAILY MX	µg/L		Continuous	RCORDR
Ecoli	SAMPLE MEASUREMENT	*****	*****	*****	*****	3.17	*****	35	MPN	0	05/07	GR
Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	126 MO GEO	*****	409 DAILY MX	MPN		Weekdays	GRAB
BOD, carbonaceous, 05 day, 20C	SAMPLE MEASUREMENT	2,320	3,054	9,609	lb/d	6.9	8.30	23.6	mg/L	0	05/07	24
80082 1 0 Effluent Gross	PERMIT REQUIREMENT	6,672 MO AVG	10,675 WKLY AVG	Req. Mon. DAILY MX	lb/d	25 MO AVG	40 WKLY AVG	Req. Mon. DAILY MX	mg/L		Weekdays	COMP24
BOD, carbonaceous, 05 day, 20C	SAMPLE MEASUREMENT	*****	*****	*****	*****	129.6	*****	*****	mg/L	0	02/30	24
80082 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. MO AVG	*****	*****	mg/L		Twice per Month	COMP24
BOD % Removal	SAMPLE MEASUREMENT	*****	*****	*****	*****	96.6	*****	*****	%	0	01/30	CA
Effluent	PERMIT REQUIREMENT	*****	*****	*****	*****	85 MINIMUM	*****	*****	%		Monthly	CALC

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
AARON FOX OPERATIONS SUPERINTENDENT		978 674-4248		05/13/2020
TYPED OR PRINTED		AREA CODE	NUMBER	MM/DD/YYYY



SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

Lowell Regional Wastewater Utility

NPDES Report (Permit NO. MA0100633)

April 2020

Printed on Wed May 13 2020

Page 1 of 2

Date	Plant Effluent Flow			D.O.	Chlorine Residual	Chlorine Residual Continuous Recording		Plant Effluent pH			E-coli (cfu/100 ml)	Effluent CBOD			Effluent TSS		
	Total (MG)	Max. Hourly (MGD)	Min. Hourly (MGD)			Avg. (mg/L)	Max. (mg/L)	Min.	Max.	Grab		(mg/L)	(lbs)	(% Rem)	(mg/L)	(lbs)	(% Rem)
01-Wed	35.63	37.89	26.50	7.6	0.03	0.00	0.03	6.7	6.8	7.0	5	4.2	1,248.0	95.35	5.6	1,664.0	94.3
02-Thu	34.03	46.33	26.01	11.2	0.03	0.01	0.06	6.7	6.8	6.9	4				8.0	2,270.5	
03-Fri	69.05	90.28	45.52	10.7	0.15	0.06	0.51	6.4	6.8	6.7	34						
04-Sat	46.24	60.34	40.11	10.1	0.00	0.01	0.03	6.5	6.7	6.7							
05-Sun	40.59	43.27	36.70	11.3	0.01	0.01	0.02	6.6	6.7	6.8		3.9	1,320.4	95.24	11.4	3,859.5	90.7
06-Mon	39.03	42.10	34.58	9.9	0.00	0.01	0.03	6.6	6.7	6.9	35	4.0	1,302.0	96.31	7.3	2,376.2	94.1
07-Tue	37.00	40.33	30.42	9.9	0.07	0.00	0.01	6.7	6.8	6.9	8	4.4	1,357.8	95.75	7.9	2,437.9	95.0
08-Wed	35.95	39.64	29.62	9.7	0.02	0.00	0.02	6.7	6.8	6.9	20	5.6	1,678.8		7.5	2,248.4	
09-Thu	48.82	92.16	27.74	10.3	0.06	0.03	0.26	6.5	6.8	7.0	9	23.6	9,608.6		38.0	15,471.4	
10-Fri	43.08	56.98	35.57	9.9	0.06	0.00	0.11	6.5	6.8	6.8	0						
11-Sat	36.83	40.40	29.69	10.0	0.01	0.01	0.02	6.6	6.8	6.9							
12-Sun	34.85	39.75	27.78	9.9	0.01	0.01	0.04	6.6	6.8	6.8		2.0	581.3	98.36	7.4	2,150.9	94.9
13-Mon	50.19	77.83	27.71	10.0	0.00	0.04	0.17	6.5	6.8	6.8	11	16.3	6,822.8		28.8	12,055.0	
14-Tue	38.60	43.21	32.29	9.8	0.05	0.00	0.02	6.5	6.7	6.8	0	4.1	1,319.7	93.72	6.8	2,188.8	99.3
15-Wed	36.82	41.27	30.50	7.3	0.01	0.01	0.07	6.6	6.8	6.9	2	4.0	1,228.1	97.74	5.9	1,811.5	96.3
16-Thu	35.93	40.04	28.75	7.5	0.14	0.00	0.03	6.6	6.8	6.7	2	4.6	1,378.5		5.2	1,558.3	
17-Fri	34.64	38.62	28.11	7.7	0.01	0.00	0.02	6.6	6.7	6.8	4						
18-Sat	40.90	45.06	29.98	7.8	0.03	0.02	0.07	6.6	6.7	6.9							
19-Sun	35.66	39.55	27.57	8.1	0.05	0.01	0.05	6.6	6.8	6.9		4.4	1,308.5	95.85	6.8	2,022.2	94.8
20-Mon	33.32	37.59	26.71	8.2	0.03	0.01	0.03	6.6	6.8	6.9		4.8	1,333.9	97.18	6.3	1,750.8	95.5
21-Tue	39.54	87.68	25.30	9.6	0.00	0.03	0.24	6.6	6.8	6.8	1	19.8	6,529.5		25.6	8,442.2	
22-Wed	32.70	36.70	26.04	8.0	0.00	0.00	0.01	6.6	6.8	6.7	0	5.2	1,418.1	97.13	7.3	1,990.8	95.3
23-Thu	31.11	35.46	24.74	8.0	0.14	0.00	0.01	6.7	6.8	6.9	2	5.2	1,349.3	97.34	6.1	1,582.8	95.6
24-Fri	30.54	34.86	24.27	10.2	0.01	0.00	0.01	6.6	6.8	6.8	1						
25-Sat	28.76	33.07	22.35	10.6	0.01	0.00	0.00	6.6	6.8	6.9	1						
26-Sun	31.45	46.70	22.31	10.0	0.01	0.01	0.06	6.7	6.8			4.4	1,154.1		8.1	2,124.6	
27-Mon	45.83	60.63	33.35	9.2	0.06	0.02	0.06	6.5	6.8	6.9	0	10.0	3,821.8		13.2	5,044.8	
28-Tue	35.59	46.53	10.84	10.0	0.01	0.01	0.07	4.7	7.4	6.6	1	5.0	1,484.2	97.88	6.5	1,929.5	94.8
29-Wed	32.12	36.54	25.34	10.4	0.02	0.01	0.03	6.5	6.6	6.7	1	3.0	803.6	97.81	4.4	1,178.6	96.9
30-Thu	32.69	39.48	25.12	10.4	0.02	0.01	0.04	6.5	6.6	6.6	9	6.1	1,663.1		7.7	2,099.3	
Min	28.76	33.07	10.84	7.3	0.00	0.00	0.00	4.7	6.6	6.6	0	2.0	581	93.7	4.4	1,179	90.7
Max	69.05	92.16	45.52	11.3	0.15	0.06	0.51	6.7	7.4	7.0	35	23.6	9,609	98.4	38.0	15,471	99.3
Avg	38.25	48.34	28.72	9.4	0.04	0.011	0.07				7	6.9	2,320	96.6	10.5	3,557	95.2
Total	1,147.47										3		48,712			78,258	

Lowell Regional Wastewater Utility

NPDES Report (Permit NO. MA0100633)

April 2020

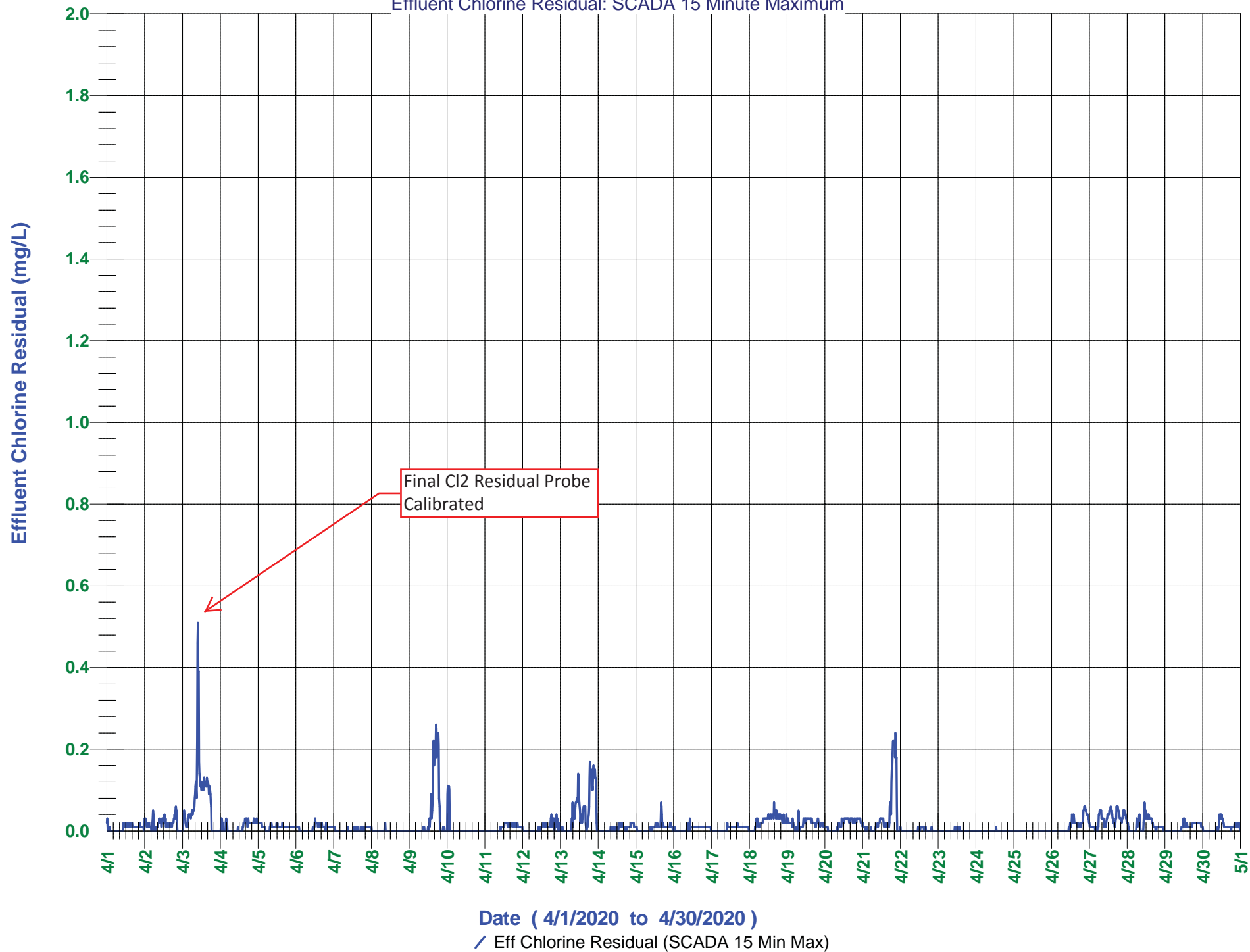
Printed on Wed May 13 2020

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Date	Total Nitrogen	TKN	Nitrate + Nitrite	Total Phosphorus
	(mg/L)	(mg/L)	(mg/L)	(mg/L)
01-Wed	13.78	13.08	0.70	0.44
02-Thu				
03-Fri				
04-Sat				
05-Sun				
06-Mon	11.77	11.08	0.69	1.22
07-Tue				
08-Wed				
09-Thu				
10-Fri				
11-Sat				
12-Sun				
13-Mon				
14-Tue				
15-Wed	10.42	9.24	1.18	0.44
16-Thu				
17-Fri				
18-Sat				
19-Sun	14.73	13.60	1.13	1.42
20-Mon				
21-Tue				
22-Wed				
23-Thu				
24-Fri				
25-Sat				
26-Sun				
27-Mon	28.50	10.80	17.70	0.57
28-Tue				
29-Wed				
30-Thu				
Min	10.42	9.24	0.69	0.44
Max	28.50	13.60	17.70	1.42
Avg	15.84	11.56	4.28	0.82
Total	79.20	57.80	21.40	4.09

Lowell Regional Wastewater Utility - MA0100633

Effluent Chlorine Residual: SCADA 15 Minute Maximum



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 2, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
35.38	49.60	57.53

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.18	7	0.04	0.01
Warren	0.18	7	0.05	0.02

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
55	0.27

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 2, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			0.01
17:00			0.01
18:00			0.04
19:00			0.05
20:00	12	0.10	
21:00	43	0.17	
22:00			0.01
23:00			0.02
24:00			0.04

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	55	0.27	0.18

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 2, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 2, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			0.01
17:00			0.01
18:00			0.04
19:00			0.05
20:00			
21:00			
22:00			0.01
23:00			0.02
24:00			0.04

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.18

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 2, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

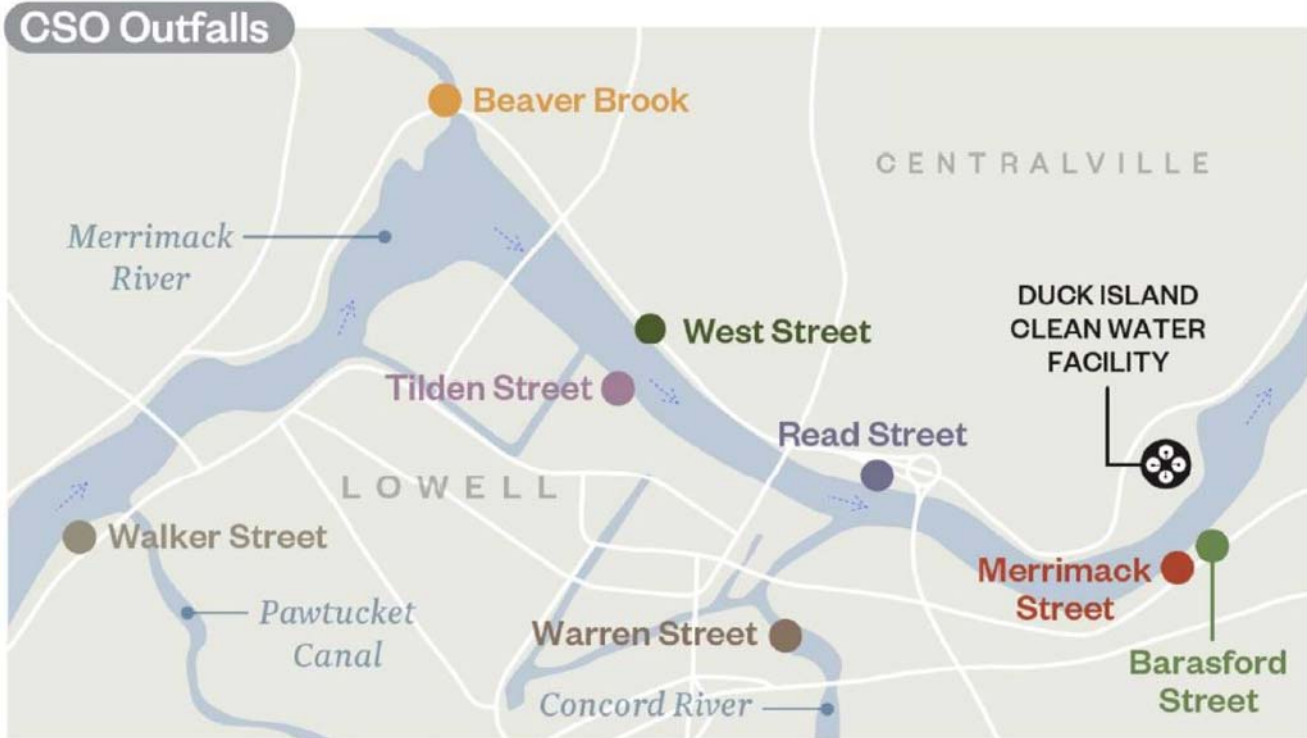
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 3, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
69.82	92.50	103.69

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	1.32	24	0.12	0.04
Warren	1.20	24	0.12	0.04

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
1,330	25.61

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 3, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00	5	0.19	0.07
02:00	60	0.60	0.03
03:00	60	0.34	0.04
04:00	60	0.39	0.07
05:00	60	0.68	0.06
06:00	60	0.69	0.07
07:00	60	0.70	0.12
08:00	60	0.96	0.11
09:00	60	1.60	0.06
10:00	60	2.08	0.10
11:00	60	1.80	0.05
12:00	60	1.91	0.04
13:00	60	1.92	0.06
14:00	60	1.86	0.03
15:00	60	1.89	0.07
16:00	60	1.92	0.04
17:00	60	1.79	0.01
18:00	47	1.54	0.02
19:00	33	0.30	0.02
20:00	45	0.40	0.03
21:00	60	0.50	0.03
22:00	60	0.52	0.03
23:00	60	0.53	0.02
24:00	60	0.50	0.02

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	1,330	25.61	1.20

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 3, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 3, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			0.07
02:00			0.03
03:00			0.04
04:00			0.07
05:00			0.06
06:00			0.07
07:00			0.12
08:00			0.11
09:00			0.06
10:00			0.10
11:00			0.05
12:00			0.04
13:00			0.06
14:00			0.03
15:00			0.07
16:00			0.04
17:00			0.01
18:00			0.02
19:00			0.02
20:00			0.03
21:00			0.03
22:00			0.03
23:00			0.02
24:00			0.02

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			1.20

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 3, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

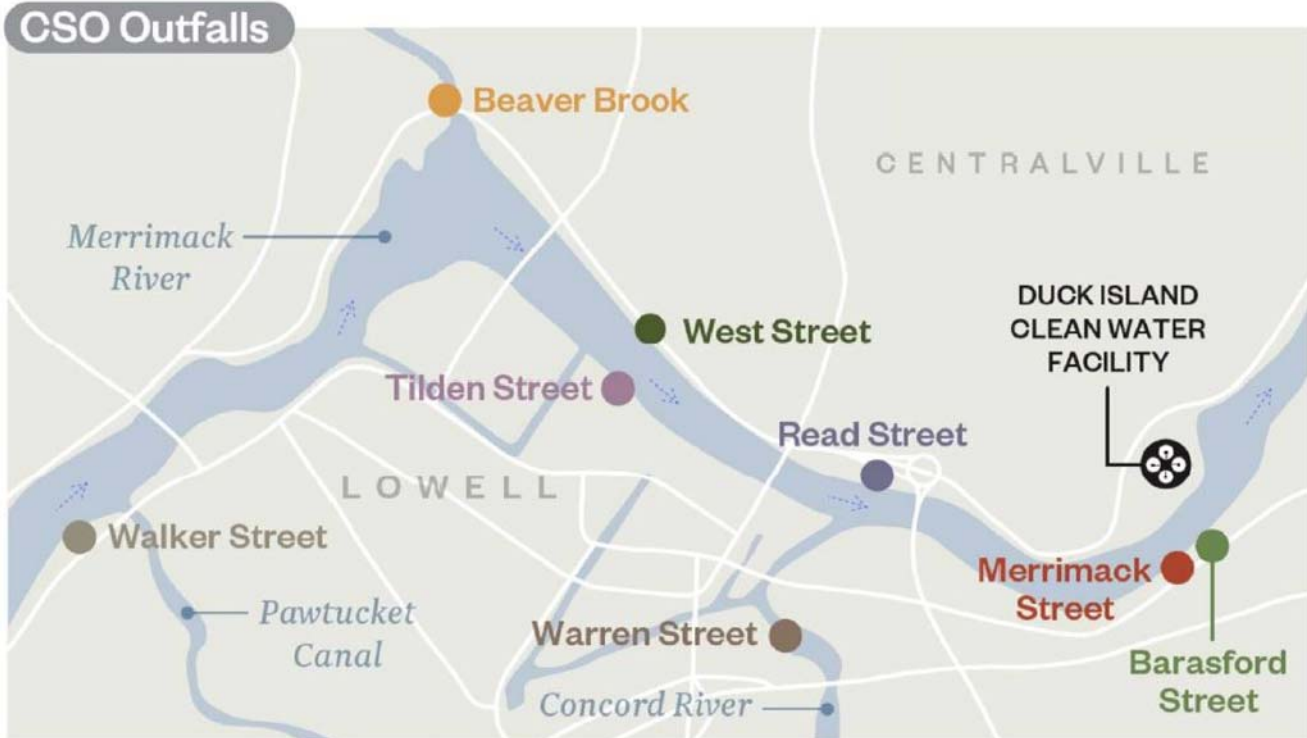
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Sat, Apr 4, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
48.27	62.08	70.88

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.03	3	0.01	0.01
Warren	0.03	3	0.01	0.01

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
373	2.25

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Sat, Apr 4, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00	60	0.50	0.01
02:00	60	0.40	
03:00	60	0.29	0.01
04:00	60	0.40	0.01
05:00	60	0.36	
06:00	38	0.15	
07:00	35	0.15	
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	373	2.25	0.03

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Sat, Apr 4, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Sat, Apr 4, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			0.01
02:00			
03:00			0.01
04:00			0.01
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.03

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Sat, Apr 4, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

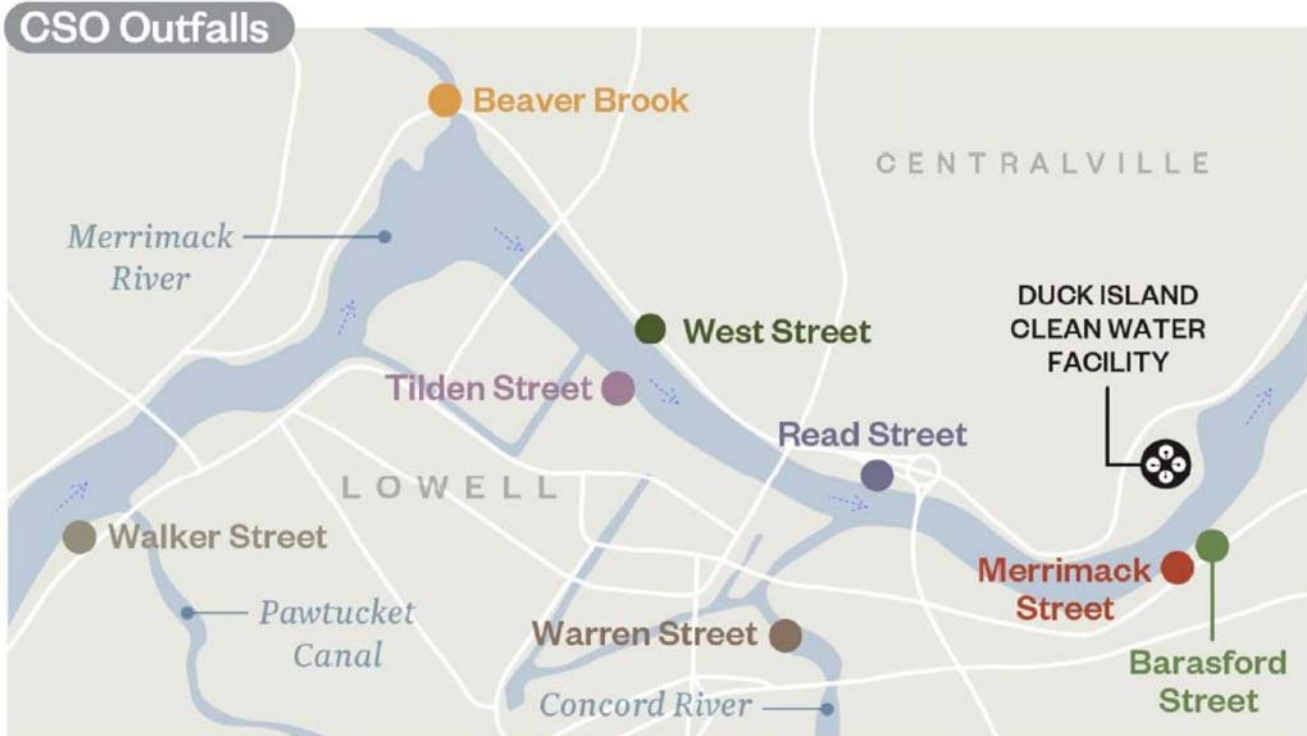
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 9, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
51.14	90.86	95.38

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.88	10	0.21	0.07
Warren	0.88	10	0.21	0.07

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
512	11.45

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)
669	8.30

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 9, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			0.01
12:00			0.07
13:00			0.05
14:00			0.11
15:00	29	0.61	0.12
16:00	60	1.89	0.14
17:00	52	1.85	0.21
18:00	46	1.81	0.05
19:00	36	1.52	0.01
20:00	49	0.72	0.11
21:00	60	0.79	
22:00	60	0.79	
23:00	60	0.78	
24:00	60	0.69	

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00	20	0.03
21:00	39	0.03
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00	9	0.02
14:00	60	0.35
15:00	60	0.56
16:00	60	0.75
17:00	60	0.98
18:00	60	0.73
19:00	60	0.43
20:00	60	0.48
21:00	60	0.45
22:00	60	0.24
23:00	60	0.20
24:00	60	0.08

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	512	11.45	0.88

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)
	59	0.06

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)
	669	5.27

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 9, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00	27	0.83
18:00	45	1.10
19:00	24	0.15
20:00	43	0.41
21:00	30	0.48
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)
	169	2.97

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 9, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			0.01
12:00			0.07
13:00			0.05
14:00			0.11
15:00			0.12
16:00			0.14
17:00			0.21
18:00			0.05
19:00			0.01
20:00			0.11
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.88

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Thu, Apr 9, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

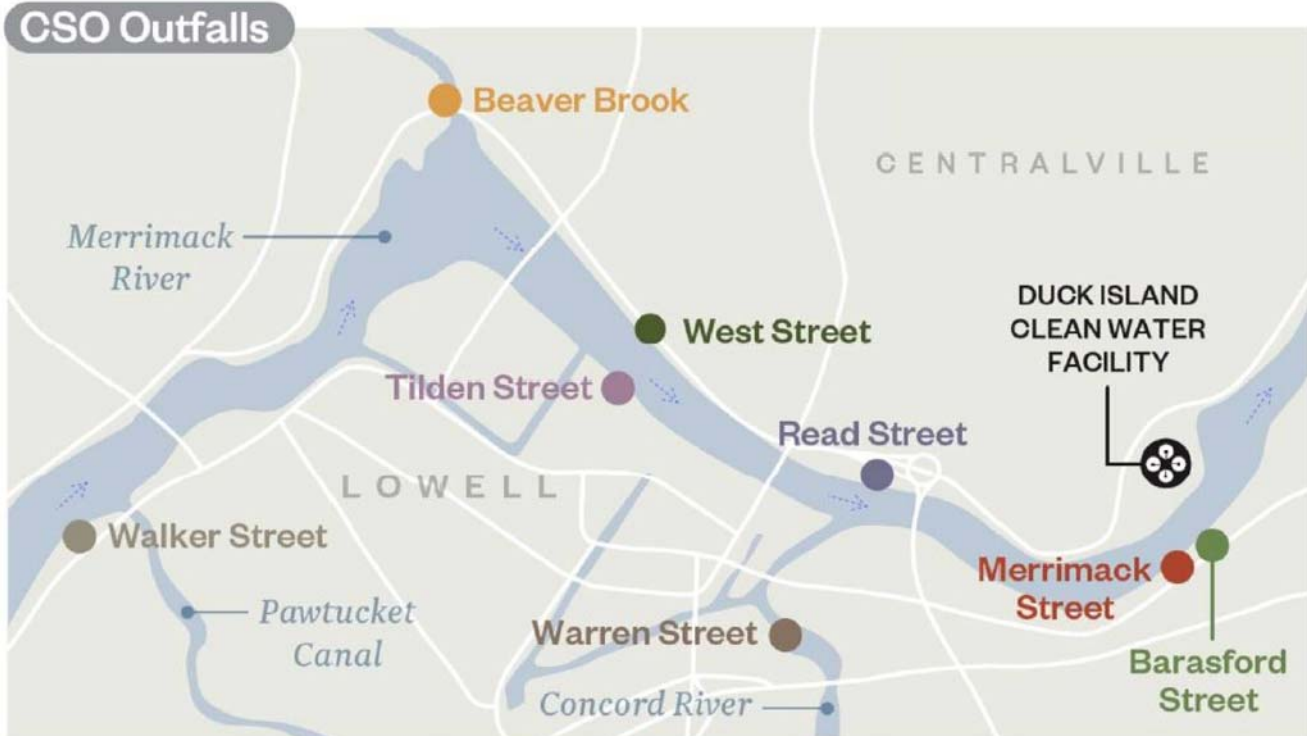
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 10, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
44.69	60.16	59.77

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.02	1	0.02	0.01
Warren	0.01	1	0.01	0.01

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
343	2.61

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 10, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00	60	0.62	
02:00	60	0.53	
03:00	60	0.43	
04:00	60	0.52	
05:00	60	0.38	
06:00	43	0.13	
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			0.01
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	343	2.61	0.01

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 10, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 10, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			0.01
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.01

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Fri, Apr 10, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

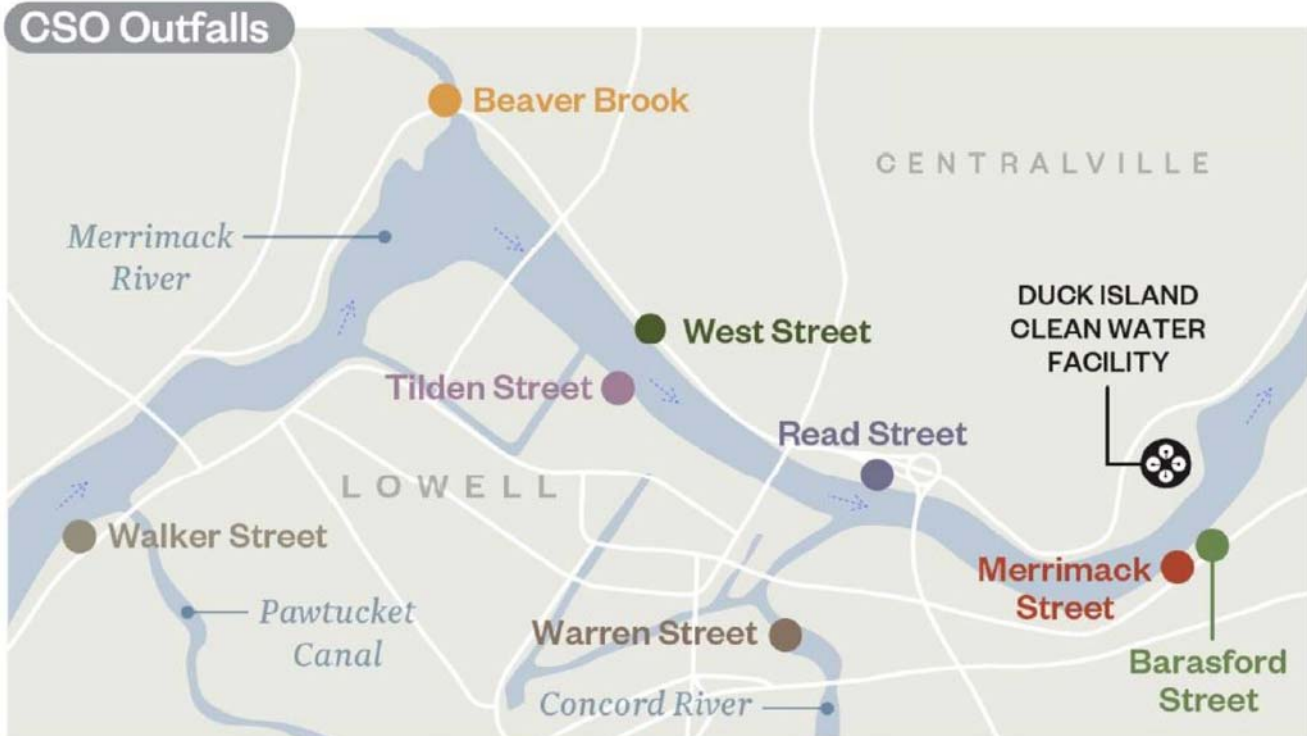
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 13, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
51.55	82.17	88.63

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.74	16	0.09	0.06
Warren	0.70	15	0.08	0.06

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
817	11.68

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 13, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			0.01
06:00			0.03
07:00			0.03
08:00			0.03
09:00			0.06
10:00			0.01
11:00	53	0.41	0.07
12:00	44	0.63	0.01
13:00	60	0.42	
14:00	60	0.20	0.04
15:00	60	0.48	0.06
16:00	60	0.79	
17:00	60	0.70	0.08
18:00	60	0.86	0.08
19:00	60	1.43	0.06
20:00	60	1.48	0.08
21:00	60	1.47	0.05
22:00	60	1.39	
23:00	60	0.96	
24:00	60	0.46	

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	817	11.68	0.70

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 13, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 13, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			0.01
06:00			0.03
07:00			0.03
08:00			0.03
09:00			0.06
10:00			0.01
11:00			0.07
12:00			0.01
13:00			
14:00			0.04
15:00			0.06
16:00			
17:00			0.08
18:00			0.08
19:00			0.06
20:00			0.08
21:00			0.05
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.70

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 13, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

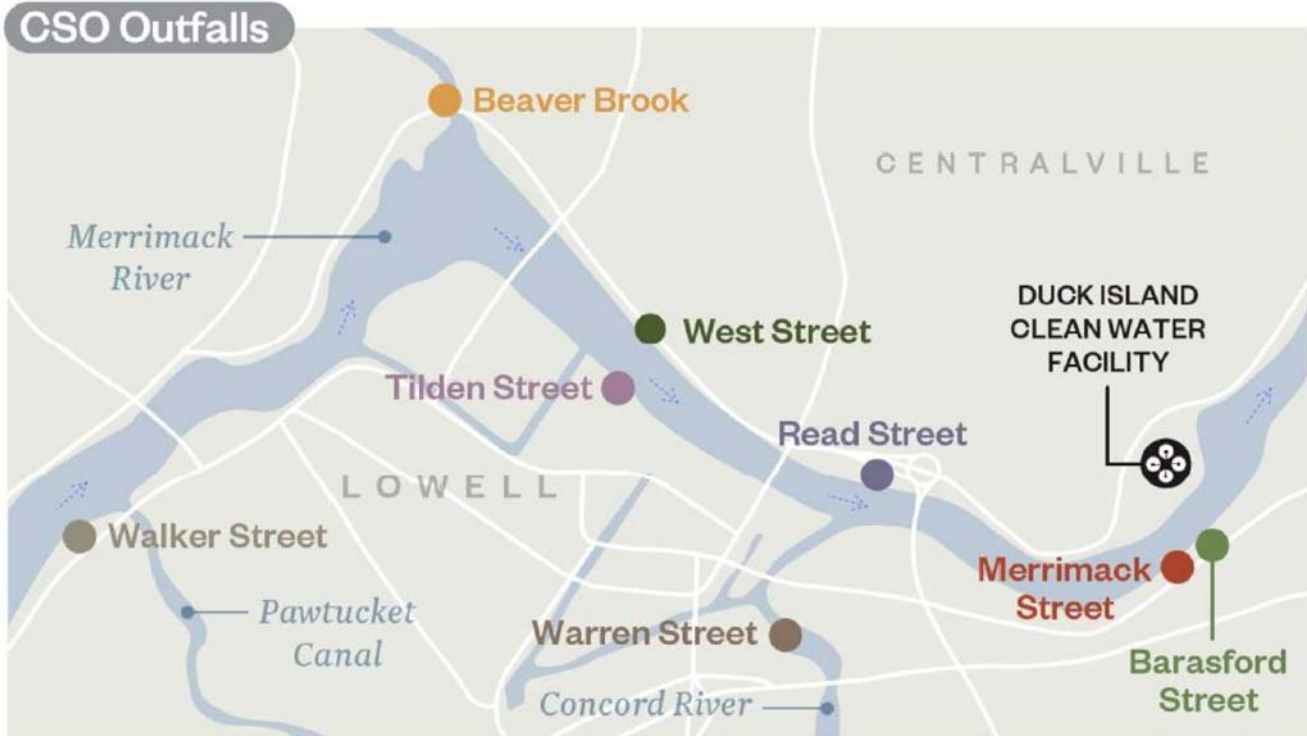
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 14, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
40.63	49.99	47.84

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge				
Warren				

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
40	0.20

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 14, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00	38	0.15	
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00	2	0.05	
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	40	0.20	0.00

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 14, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 14, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 14, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

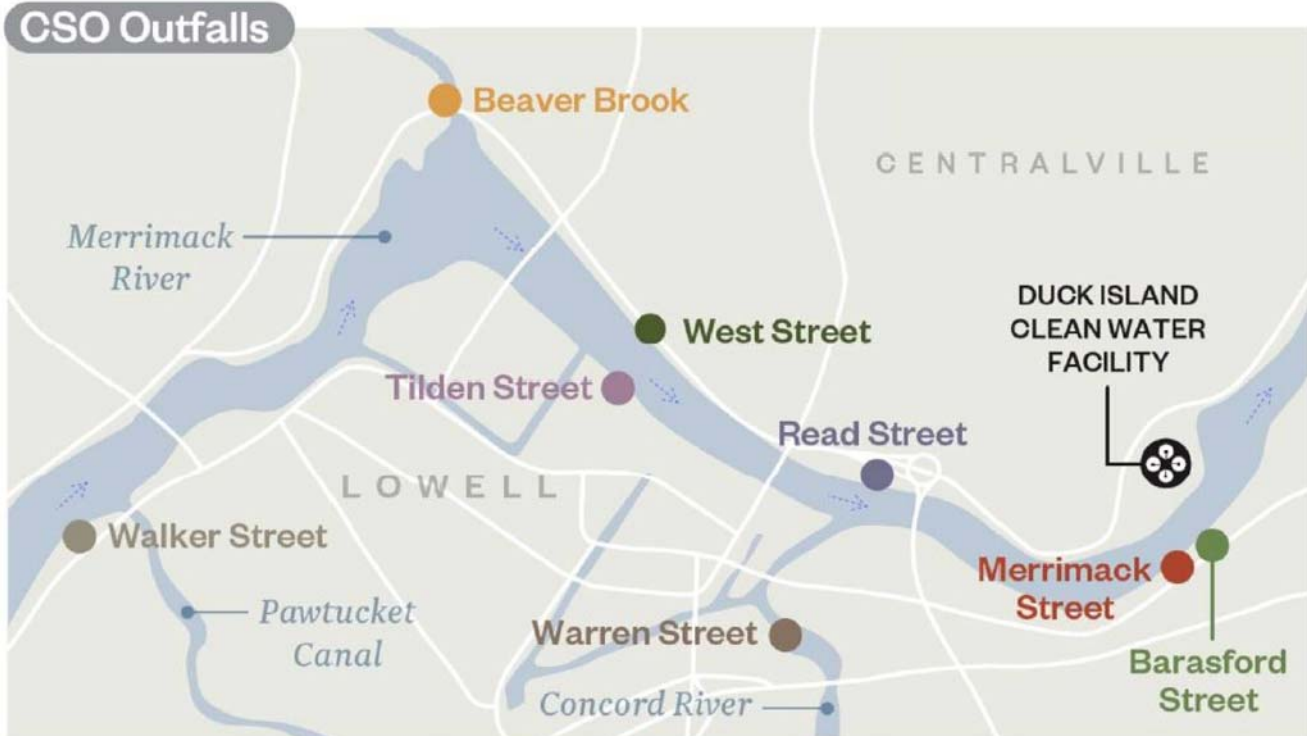
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 21, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
41.35	86.26	94.24

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.32	3	0.15	0.14
Warren	0.32	3	0.17	0.14

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Minutes)	Volume (MG)
239	6.27

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 21, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			0.17
18:00	22	0.64	0.11
19:00	60	1.88	0.04
20:00	60	1.66	
21:00	60	1.77	
22:00	37	0.32	
23:00			
24:00			

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	239	6.27	0.32

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 21, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 21, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			0.17
18:00			0.11
19:00			0.04
20:00			
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.32

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 21, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

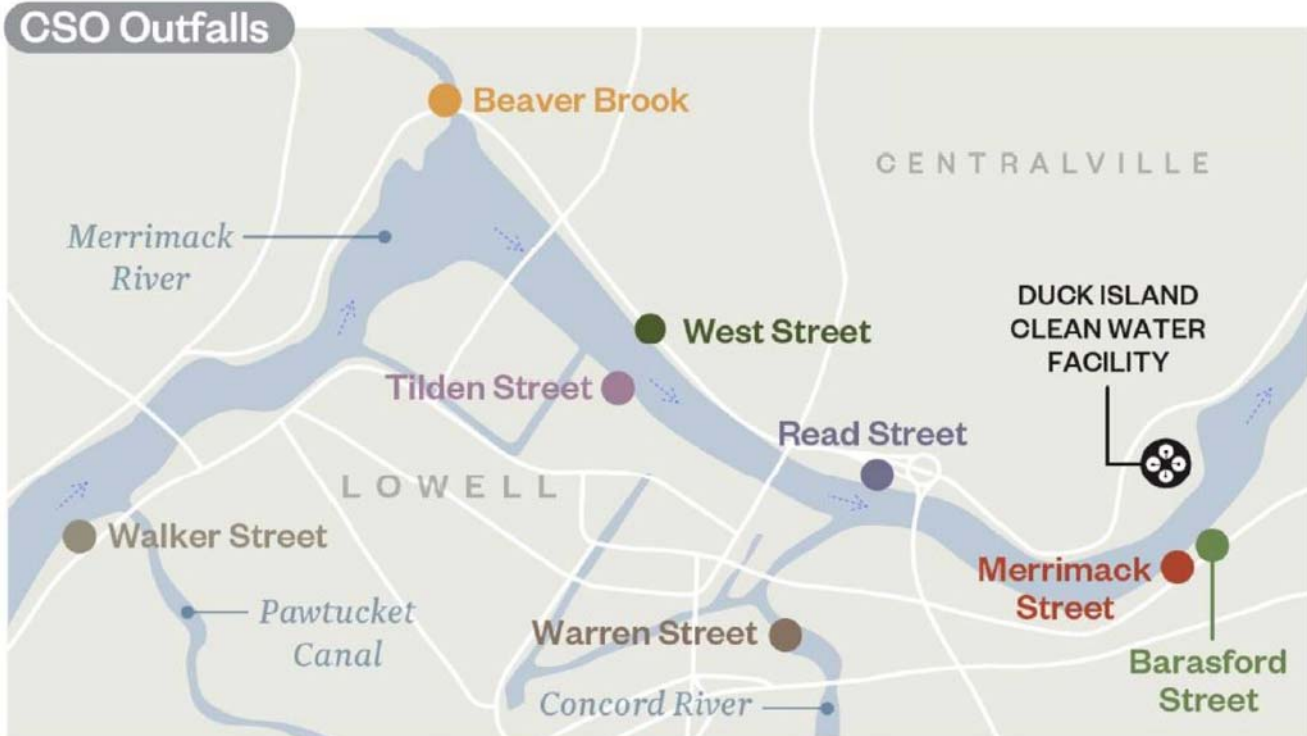
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 27, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

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Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
47.03	61.75	63.24

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge	0.74	14	0.24	0.23
Warren	0.64	14	0.24	0.22

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Hours)	Volume (MG)
6.80	2.95

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 27, 2020

High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			0.24
11:00			0.03
12:00			0.04
13:00			0.03
14:00	53	0.21	0.02
15:00			0.02
16:00			0.02
17:00			0.04
18:00	27	0.33	0.05
19:00	60	0.54	0.01
20:00	60	0.35	0.02
21:00	28	0.15	0.04
22:00	60	0.34	0.06
23:00	60	0.60	0.02
24:00	60	0.43	

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	408	2.95	0.64

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 27, 2020

Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 27, 2020

Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			0.24
11:00			0.03
12:00			0.04
13:00			0.03
14:00			0.02
15:00			0.02
16:00			0.02
17:00			0.04
18:00			0.05
19:00			0.01
20:00			0.02
21:00			0.04
22:00			0.06
23:00			0.02
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
			0.64

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Mon, Apr 27, 2020

Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

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Million gallons of flow treated at Duck Island

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The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

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Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

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Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

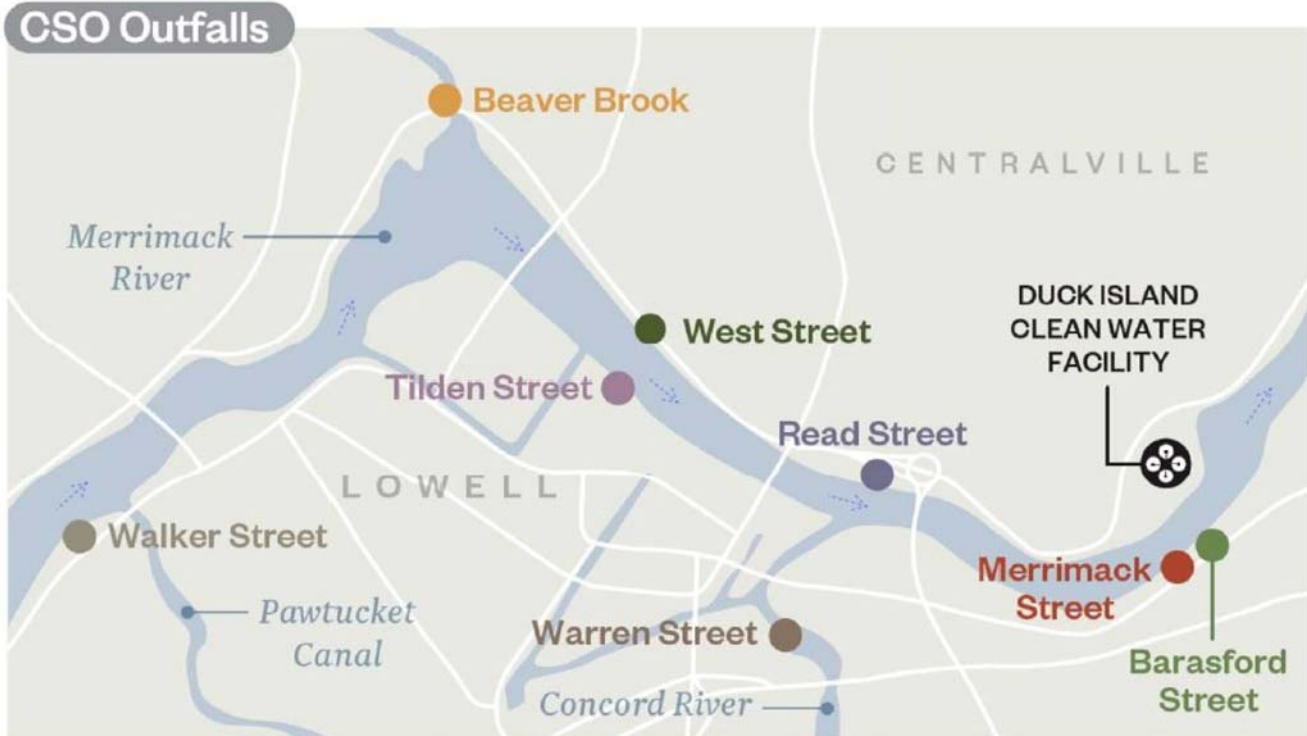
The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.



Lowell Wastewater Utility

Downstream Notification Report

NPDES Permit No: MA0100633

Date of Event:

Tue, Apr 28, 2020

Dear Environmental Professionals and Interested Parties:

This report describes high-flow treatment performed at Lowell's Duck Island Clean Water Facility, as well as discharges of untreated Combined Sewer Overflows (CSOs) at the Utility's diversion structures.

High-flow treatment refers to combined stormwater and sewage that receives screening and clarification before being mixed with water receiving biological treatment. This mixture is then disinfected and discharged into the Merrimack River in full compliance with secondary treatment standards.

CSO diversions are an untreated mixture of stormwater and dilute sewage that is discharged directly into nearby receiving waters when the capacity of the treatment and transport systems are exceeded as a result of heavy rain. These diversions occur only when necessary to protect public health and safety.

Please refer to the final two pages of this report for an explanation of terms.

Wastewater Flow to Duck Island		
Daily Flow Rate (MGD)	Peak Hourly Flow Rate (MGD)	Instantaneous Peak Flow Rate (MGD)
36.53	53.44	59.26

	Rainfall			
	Daily Rainfall (in)	Duration Total (hr)	Max Hourly Rainfall (in/hr)	Peak Intensity (in/15-min)
River's Edge				
Warren				

Rain data may be inaccurate during cold weather

High-Flow Treatment Summary	
Duration (Hours)	Volume (MG)
0.68	1.20

Combined Sewer Overflows Summary	
Duration (Minutes)	Volume (MG)

Person Reporting Event: Gordon Bergeron - Lowell Water Engineering

Lowell Wastewater Utility

Downstream Notification Report

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High-Flow Treatment Duck Island			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00	15	0.05	
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00	13	0.77	
22:00	13	0.38	
23:00			
24:00			

Barasford Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Beaver Brook Station Diversion to Beaver Brook		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

High-Flow Treatment Duck Island			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)
	41	1.20	0.00

Barasford Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Beaver Brook Station To Beaver Brook		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

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Merrimack Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
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17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Read Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
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16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Tilden Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
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17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Merrimack Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Read Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Tilden Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

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Date of Event:

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Walker Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Warren Station Diversion to Concord River			
Time	Duration (Minutes)	Volume (MG)	Warren Rain (in)
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			
24:00			

West Station Diversion to Merrimack River		
Time	Duration (Minutes)	Volume (MG)
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

Walker Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Warren Station To Concord River			
24 Hour	Total Duration (Minutes)	Total Volume (MG)	Total Rainfall (in)

West Station To Merrimack River		
24 Hour	Total Duration (Minutes)	Total Volume (MG)

Lowell Wastewater Utility

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Definitions and Abbreviations:

Flow Reporting Terms:

MG:

Volume in million gallons, (e.g. 2 MG = 2 million gallons)

MGD:

Flow rate in million gallons per day (e.g. a rate of 1 MGD sustained for 1 day would result in a volume of 1 MG)

Daily Flow Rate, million gallons per day (MGD):

Million gallons of flow treated at Duck Island

Peak Hourly Flow Rate (MGD):

The highest flow rate treated at Duck Island over a rolling one-hour period

Instantaneous Peak Flow Rate (MGD):

The highest flow rate treated at Duck Island at any moment of the day

Duration (Minutes):

Number of minutes in a given hour or over the course of the day a flow was measured

Weather Reporting Terms:

Rainfall Measurement:

Rainfall is measured by Lowell's network of rain gauges

Daily Rainfall, inches (in):

The total depth of rainfall measured by each rain gauge over the course of the day

Maximum Hourly Rainfall (in/hr):

The greatest total depth of rainfall measured by a rain gauge in one hour

Peak Intensity, inches per 15 minutes (in/15-min):

The greatest total depth of rainfall received in any 15-minute period.

Duration (Hour):

The number of hours in the day during which it rained.

